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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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MOTOROLA, INC. 1303 EAST ALGONQUIN ROAD IL01/3RD SCHAUMBURG, IL 60196			STORM, DONALD L	
			ART UNIT	PAPER NUMBER
			2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/797,992	BUHRKE, ERIC R.	
	Examiner	Art Unit	
	Donald L. Storm	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

The Applicant's PRELIMINARY AMENDMENT, filed on February 14, 2006, has been entered. An action continuing examination on the merits follows. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Informalities

2. Claim 2, and by dependency claim 3, are objected to under 37 CFR 1.75(a) because the meaning of the phrase "the step of analyzing" (line 2) needs clarification. Because no analyzing was previously recited, it may be unclear as to what element this phrase refers. To further timely prosecution and evaluate prior art, the Examiner has interpreted this phase as --the step of generating--.

3. Claim 9 is objected to for the same reasons as claim 2 because the limitations are recited using obviously similar phrases.

4. Claim 10, and by dependency claim 11, are objected to for the same reasons as claim 2 because the limitations are recited using obviously similar phrases.

5. Claim 15 is objected to under 37 CFR 1.75(a) because the meaning of the phrase "the step of conversion" (line 2), and the meaning of the symbol "N" (line 2) need clarification. Because no

conversion and no definition of “N” were previously recited, it may be unclear as to what element this phrase refers. To further timely prosecution and evaluate prior art, the Examiner has interpreted claim 15 as dependent to claim 8, because that is the nearest preceding claim to provide sufficient antecedence.

6. Claim 15 is objected to for the same reasons as claim 2 because the limitations are recited using obviously similar phrases.

Claim Rejections - 35 USC § 102

Basu

7. Claims 1, 4, 5, 9, and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Basu [US Patent 6,594,629], already of record.

8. Regarding claim 14, Basu [at column 17] describes an apparatus for extracting visemes from an audio speech signal by describing the content and functionality of the recited limitations recognizable as a whole to one versed in the art as the following terminology:

means for receiving digitized analog speech information from the audio speech signal, means for filtering, and means for generating [see Fig. 12, and its descriptions, especially at column 18, line 66-column 19, line 59, of the processor, memory, and software of the sampled audio (talking, speech) stream];

successive speech is frames at a fixed rate [at column 17, lines 42-43, as audio frames spaced 10 msec in time];

receiving the speech as successive speech at the fixed rate [at column 6, lines 16-18, as the every 10-msec advance of a segment of speech];

filtering each of the successive frames of digitized analog speech information to synchronously generate time domain frame vectors at the fixed rate [see Fig. 12, and its

descriptions, especially at column 6, lines 14-19, of the extraction process advancing segments of sampled speech every 10 msec and extracting succeeding acoustic cepstral vectors];

wherein each of the vectors is derived from one of the successive frames [at column 6, lines 14-19, as succeeding acoustic cepstral vectors extracted from each 10-msec advance of the segment of speech];

they are classification vectors [at column 6, lines 38-40, as the probability module labeling the extracted vectors with phonemes];

synchronously generate a sequence of a set of visemes wherein each set of visemes in the sequence is derived for a corresponding one of the vectors [at column 17, lines 51-55, as assign probabilities to visemes for vectors provided to the probability module of the time instant when the audio frame occurs].

9. Claim 1 sets forth a method with limitations comprising the functionality associated with using the apparatus recited in claim 14. Basu describes those similar limitations as indicated there; accordingly, this claim also is anticipated.

10. Regarding claim 4, Basu also describes:

each set includes viseme identifiers [at column 13, lines 42-44 and 55-56, as visual speech feature vectors (visemes) labeled with phonemes];

each set includes confidence numbers [at column 13, lines 61-62, as combine with a confidence estimation that refers to a likelihood];

the confidence corresponds one to one [at column 13, lines 44-46, as each phoneme associated with visual speech feature vectors has a probability associated therewith].

11. Regarding claim 5, Basu describes the included claim elements by dependency as indicated elsewhere in this Office action. Basu also describes:

the set consists of an identity of the most likely one [at column 18, lines 5 and 53-54, as rescore the N-best list to recognize the highest likelihood];

it is a viseme [at column 17, lines 51-55, as assign probabilities to visemes].

12. Regarding claim 9, Basu also describes:

a spatial classification [at column 18, lines 53-55, as rescore based on video].

Sutton

13. Claims 1, 2, 9, 10, and 12-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Sutton [US Patent 6,539,354], already of record.

14. Regarding claim 14, Sutton [at claim 36] describes an apparatus for extracting visemes from an audio speech signal by describing the content and functionality of the recited limitations recognizable as a whole to one versed in the art as the following terminology:

means for receiving, means for filtering, and means for generating [at column 23, lines 46-56, as computer code comprising instructions];

receiving successive frames of digitized analog speech information from the audio speech signal at a fixed rate [at column 19, lines 1-3, as receive an input stream in frames of a speech wave at a sampling rate in 10 ms frames];

filtering each of the successive frames to synchronously generate time domain vectors at the fixed rate [at column 19, lines 2-5, as compute, for each frame in 10 ms frames, a feature representation for each frame in 10 ms frames];

the vectors are frame classification vectors [at column 19, lines 5-16, as produce phoneme (phone) estimates using the window assembled from feature representations to have 16 10-ms frames, produce viseme data for the frames];

wherein each of the vectors is derived from one of the successive frames [at column 19, line 5, as compute a feature representation for each frame];

synchronously generating a sequence of a set of visemes derived from the vectors [at column 19, lines 5-16, as assemble each feature representation into a (feature) window, produce phoneme (phone) estimates using the window assembled from feature representations to have 16 10-ms frames, produce viseme data for the frames];

wherein each set of visemes in the sequence is derived from a corresponding one of the vectors [at column 26, lines 25-34, as one or more visemes active during each of the frames of a voice input is identified (for a phoneme) corresponding to each frame].

15. Claim 1 sets forth a method with limitations comprising the functionality associated with using the apparatus recited in claim 14. Basu describes those similar limitations as indicated there; accordingly, this claim also is anticipated.

16. Regarding claim 2, Sutton describes the included claim elements by dependency as indicated elsewhere in this Office action. Sutton also describes:

with a latency less than 100 msec with reference to a successive frame [at column 19, lines 27-29, as the latency is around 80 ms].

17. Regarding claim 9, Sutton also describes:

a spatial classification [at column 19, lines 33-39, as a dedicated viseme estimator trained on viseme deformability to go from speech input to visemes in a single neural network].

18. Regarding claim 10, Sutton also describes:

by a neural network (or other) [at column 19, lines 10-11, as include a neural network].

19. Claim 12 sets forth limitations similar to claim 14. Sutton describes the limitations as indicated there, for a processor and software that provide the means. Sutton also describes additional limitations as follows:

a processor and a memory that stores programmed instructions that control the processor [at column 15, lines 34-45, as a server storing all the software].

20. Claim 13 sets forth limitations similar to claim 14. Sutton describes the limitations as indicated there, for a processor and software that provide the means. Sutton also describes additional limitations as follows:

a processor and a memory that stores programmed instructions that control the processor [at column 15, lines 34-45, as a server storing all the software];

a display that displays an avatar that is formed [at column 22, lines 3-17, as a display through which a synthesis visual output according to the method has a 3D character for reading];

using the set of visemes [at column 17, lines 36-43, as viseme tracks are used to render an animation].

Claim Rejections - 35 USC § 103

Basu and Thomson

21. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Basu [US Patent 6,594,629] in view of David J. Thomson, "An Overview of Multiple-Window and Quadratic-Inverse Spectrum Estimation Methods," IEEE 1994, pp. VI 185-VI 194, both already of record.

22. Claim 6 includes the limitations of claim 1. Basu describes those limitations as indicated there. Basu also describes:

convert each frame to a spectral domain vector [at column 6, lines 20-21, as extract magnitudes of discrete Fourier transforms in a frame];

convert the spectral vectors using DCT [at column 8, lines 24-28, as transform the amplitude values, subsequently apply a discrete cosine transform].

However, Basu does not provide details of Fourier transformation to the spectral domain. In particular, Basu does not explicitly describe using prolate spheroid basis functions.

Thomson [at section 2., section 8., and section 1.] examines transformation from the time domain to the spectral domain using the discrete Fourier transform for acoustics, speech, and signal processing, and Thomson describes:

convert to a spectral domain vector using N multi-taper discrete prolate spheroid sequence basis (MTDPSSB) functions [see Eq. (18) and its description of projecting to a frequency domain by N-1 windows of a Slepian sequence (Discrete Prolate Spheroidal Wave Functions)];

they are factors of a Fredholm integral of the first kind [at page VI-186, column 1, as the projection operation of spectrum estimation is a Fredholm integral of the first kind];

N is a positive integer [see Eq. (18) and its summation limits from 0 to N-1].

As indicated, Thomson shows that using N MTDPSSB functions was known to artisans at the time of invention. Since Thomson [at page VI-188, column 1] also points out that MTDPSSB functions have the advantage of the best possible leakage properties for handling a dynamic range, it would have been obvious to one of ordinary skill in the art of converting data to the spectral domain at the time of invention to include the concepts described by Thomson at least using the MTDPSSB functions in Basu's conversion to the spectral domain because the MTDPSSB functions were known to have the advantage of the best possible leakage properties for handling a dynamic range.

23. Regarding claim 7, Basu and Thomson describe and make obvious the included claim elements by dependency as indicated elsewhere in this Office action. Thomson also describes:

multiplying a successive frame by one of the MTDPSB functions to generate N product sets of the frame [see Eq. (18) and its description, of multiplying (for windowing) the data x_n by the N values of a Slepian sequence to generate the values of K windows];

performing a FFT of each produce set to generate N FFT sets of the frame [see Eq. (18) and its description, of the $\exp(-i2\pi f)$ and sum, for the FFT used for coefficient computation];

adding (change adding to combining because the addition is done to magnitude spectrums rather than separately to the real and imaginary components) together the N FFT sets of the frame to generate a summed FFT set of the frame [see page VI-187, column 1, and the example for a Simple Spectrum Estimate, of summing (combining) the square of the absolute value (magnitude) of K coefficients of the expansion coefficients from Fourier transforming].

24. Regarding claim 8, Basu and Thomson describe and make obvious the included claim elements by dependency as indicated elsewhere in this Office action. Thomson also describes:

scaling the summed FFT set of the successive frame(s) [see page VI-187, column 1, and the example for a Simple Spectrum Estimate, dividing by K the total of summing K coefficients of the expansion coefficients from Fourier transforming].

Sutton and Peterson

25. Claims 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutton [US Patent 6,539,354] in view of Peterson et al. [US Patent 5,067,095], using the same rationale as in a previous Office action, which is reproduced here.

26. Claim 3 includes the limitations of claim 2. Sutton describes those limitations as indicated there. Sutton [at columns 18-19] also suggests lower latency hold advantages; however, Sutton does not explicitly describe latency less than 10 msec.

Like Sutton, Peterson [at column 1, lines 56-59] describes a neural network for speech recognition, and Peterson also describes:

latency less than 10 milliseconds [at column 11, lines 27-46, as typically 20 elements and delays of 10 microseconds ($20 \times .01 \text{ ms} = .2 \text{ ms}$) to provide an output signal from the input signal].

As indicated, Peterson shows that latency less than 10 milliseconds was known to artisans at the time of invention. Since Peterson [at column 1, lines 44-55] also points out that neural network processing has the inherent advantage of offering real time execution, it would have been obvious to one of ordinary skill in the art of real time speech recognition at the time of invention to include the concepts described by Peterson at least latency less than 10 milliseconds by adjusting Sutton's neural network to a latency less than 10 milliseconds because that would provide faster processing within whatever certain degree of error can be tolerated.

27. Claim 11 includes the limitations of claim 9. Sutton describes those limitations as indicated there. Although Sutton describes speech recognition and viseme classification using neural networks, Sutton does not describe detail of a neural network. In particular, Sutton does not explicitly describe a feed-forward, memory-less, perceptron type neural network.

Like Sutton, Peterson [at column 1, lines 56-59] describes a neural network for speech recognition, and Peterson also describes:

a neural network [see Figs. 4a and 4b and their descriptions especially at column 6, lines 16-68, of the SPANN (sequence processing artificial neural network)];

feed-forward type [see Figs. 4a and 4b and their descriptions especially at column 6, lines 16-68, of signals-applied-at-the-inputs-processed-and-provided-through-the-outputs];

memory-less type [see Figs. 4a and 4b and their descriptions especially at column 6, lines 16-68, of signals-applied-processed-and-output];

perceptron type [see Figs. 4a and 4b and their descriptions especially at column 6, lines 16-68, of neurons].

As indicated, Peterson shows that a feed-forward, memory-less, perceptron type neural network was known to artisans at the time of invention. The system by Sutton requires a neural network, but merely any neural network from mature technologies. Sutton has not disclosed a preferred approach to those operations according to a design criterion or solution to any stated problem. Since it appears that the use of any neural network that is known to artisans would perform to provide Sutton's requirement of low latency, it would have been obvious to one of ordinary skill in the art of real time speech recognition at the time of invention to include the concepts described by Peterson at least a feed-forward, memory-less, perceptron type neural network according to Sutton's suggestion for low latency because Peterson [at column 1, lines 44-55] indicates that would provide faster processing within whatever certain degree of error can be tolerated.

Basu and Thomson and Peterson

28. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Basu [US Patent 6,594,629] in view of David J. Thomson, "An Overview of Multiple-Window and Quadratic-Inverse Spectrum Estimation Methods," IEEE 1994, pp. VI 185-VI 194 and Peterson et al. [US Patent 5,067,095], all already of record.

29. Claim 15 includes the limitations of claim 8, if the Examiner's assumption about dependency is correct. Basu and Thomson describe and make obvious the included claim elements by dependency as indicated elsewhere in this Office action, including Basu's speech frames spaced 10 msec in time. Thomson also describes:

N is less (than 5, or other) [at page VI-193, column 2, in paragraph leading to Eq. (78), as two Slepian sequences].

Both Basu [at column 17, lines 1-17] and Thomson [at section 1.] suggest the desirability of real-time use of recognition applications.

However, neither Basu nor Thomson explicitly describes latency less than 10 msec with respect to a frame with which the visemes correspond.

Like Basu, Peterson [at column 1, lines 56-59] describes speech recognition, and Peterson also describes:

latency less than 10 milliseconds [at column 11, lines 27-46, as typically 20 elements and delays of 10 microseconds ($20 \times .01 \text{ ms} = .2 \text{ ms}$) to provide an output signal from the input signal].

As indicated, Peterson shows that latency less than 10 milliseconds in recognition applications was known to artisans at the time of invention. Since Peterson [at column 1, lines 44-55] also points out that neural network processing has the inherent advantage of offering real time execution, it would have been obvious to one of ordinary skill in the art of real time speech recognition at the time of invention to include the concepts described by Peterson, at least latency less than 10 milliseconds with reference to Basu's successive 10-msec frames of speech being processed for viseme recognition, because that would provide processing results as near to real time as possible within whatever certain degree of error can be tolerated.

Response to Arguments

30. The prior Office action, mailed November 14, 2005, objects to the claims, and rejects claims under 35 USC § 102 and § 103, citing Basu, Sutton, and others. The Applicant's arguments and changes in PRELIMINARY AMENDMENT, filed February 14, 2006, have been fully considered with the following results.

31. With respect to objection to those claims needing clarification, the changes entered by amendment provide clear descriptions of the claimed subject matter. Accordingly, the objection is removed. Please see new grounds of objection.

32. With respect to rejection of claims under 35 USC § 102 and § 103, citing Basu alone and in combination, the Applicant's arguments appear to be as follows:

The Applicant's argument appears to be that the clear scope of the claimed invention that distinguishes from Basu is each classification vector derived from one frame of speech, and the vector leading to a corresponding set of visemes. This argument is not persuasive because Basu has successive 10-msec durations, which meet the conditions of "frame" as a term of art and which Basu calls "frames." the 10-msec segments advance, and Basu extracts a vector, which is used for classification. Basu then generates a set of visemes for the vector at the time of the audio frame. For column and line citations, see the rejection in this Office action. Column 6, lines 14-15, use the terminology "frame" to label a 25-msec segment of speech. the successive 25-msec durations also meet the conditions of "frame" as a term of art and Basu also applies the term "frame" to the 25-msec durations. However, Basu [at column 17] classifies the vectors and visemes of the 10-msec frames.

Although it is not material to the rejections and discussion of this Office action, the Examiner believes that the Applicant's characterization of "frame" as used in the art to be the "*smallest* set of digitized audio samples analyzed as a group" {italics added} is too restrictive. For example as shown in Basu, the smallest used is 10-msec, but Basu also calls 25 msec, a "frame".

The Applicant's arguments have been fully considered but they are not persuasive. Accordingly, the rejections are maintained.

33. With respect to rejection of claims under 35 USC § 102 and § 103, citing Sutton alone and in combination, the Applicant's arguments appear to be as follows:

The Applicant's argument appears to be that Sutton does not explicitly describe the correlation of visemes to vector to frame when visemes are produced using the 160-msec window of speech. This argument is not persuasive because of Sutton's embodiment of claim 36, where the embodiment with one-to-one correspondence a viseme and other visemes to each frame is explicit. As to the classification feature vector correspondence, there is also Sutton's general teaching of timing at column 19 of a feature representation for each frame in 10 ms frames. For column and line citations, see the rejection in this Office action.

The Applicant's arguments have been fully considered but they are not persuasive. Accordingly, the rejections are maintained.

34. With respect to rejection of claims under 35 USC § 103, citing Thomson in combination, the Applicant's arguments appear to be as follows:

The Applicant's argument appears to be that the Applicant has purposely chosen to trade-off more bin leakage than necessary with Thomson's functions in order to achieve a desired low level of latency. Consequently, a motivation to achieve low leakage characteristics of MTD PSSB is not appropriate. That argument is not persuasive for similar reasons that were given in the previous Office action, namely, that each artisan does not have to find the same benefits in the prior art in order to be motivated to use prior art teaching. An artisan may find the combination of teaching in the prior art advantageous for a different reason than the reason put forth by the Applicant. While the Applicant's argument here points to an advantage for low latency, it mistakenly relies on the premise that the prior art must teach that a particular reason is preferred for the combination to be obvious. As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, obviousness does not require that the teachings be combined for the reasons contemplated by the Applicant.

The Applicant's arguments have been fully considered but they are not persuasive. Accordingly, the rejections are maintained.

Conclusion

35. Any response to this action should be mailed to:

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(571) 273-8300, (for both formal communications intended for entry and for informal or draft communications, but please label informal fax as "PROPOSED" or "DRAFT")

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***** **IMPORTANT NOTICE** *****

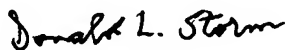
The Examiner handling this application, who was assigned to Art Unit 2654, is assigned to **DIVISION 2626** as a result of consolidation in Technology Center 2600. Please include the new Division in the caption or heading of any communication. Your cooperation in this matter will assist in the timely processing of the submission and is appreciated by the Office.

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald L. Storm, of Division 2626, whose telephone number is (571) 272-7614. The examiner can normally be reached on weekdays between 7:00 AM and 3:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571) 272-7602.

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July 11, 2006


Donald L. Storm
Examiner, Division 2626